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WHAT IS CLAIMED IS:

1. A power IC for an automobile engine control unit incorporating at least one semiconductor device comprising an N-channel insulated-gate field-effect transistor on an SOI (Silicon On Insulator) substrate having an N-type device-forming region, the N-channel insulated-gate field-effect transistor including high concentration N-type and P-type layers both in contact with a source electrode, a gate insulating film/gate electrode in contact with the high concentration N-type layer, a high concentration N-type layer in contact with a drain electrode disposed in a lateral direction via a field oxide film contacting the gate electrode, and a p-type semiconductor layer (p-body layer) contacting the gate oxide film and the high concentration N-type and P-type layers both in contact with the source electrode,

wherein, when a distance from an end of the field oxide film contacting the high concentration N-type layer in contact with the drain electrode to ends of the gate electrode and the gate oxide film both in contact with the high concentration N-type layer contacting the source electrode is defined as a source-drain distance, the N-channel insulated-gate field-effect transistor further comprises:

an N-type layer having a concentration higher than a concentration of an N-type layer in contact with the p-body layer, formed in a region covering at most 95% of the source-drain distance between the p-body layer and the drain electrode in the silicon substrate over an interface of a buried oxide film, the silicon substrate being in contact with both the field oxide film and the high concentration N-type layer contacting the drain electrode.

2. A semiconductor device for an automobile engine control unit, wherein:

a rated breakdown voltage of the semiconductor device is higher than 40 volts;

the semiconductor device is provided with an N-channel insulated-gate field-effect transistor on an N-type SOI (Silicon On Insulator), the N-channel insulated-gate field-effect transistor including high concentration N-type and P-type layers both in contact with a source electrode, a gate insulating film/gate electrode in contact with the high concentration N-type layer, a high concentration N-type layer in contact with a drain electrode disposed in a lateral direction via a field oxide film contacting the gate electrode, and a P-type semiconductor layer (p-body layer) contacting the gate oxide film and the high concentration N-type and P-type layers both in contact with the source electrode; and

between the p-body layer and the drain electrode over an interface of a buried oxide film in the silicon substrate being in contact with both the field oxide film and the high concentration N-type layer contacting the drain electrode of the N-channel insulated-gate field-effect transistor, an N-type layer having a concentration higher than a concentration of the N-type layer in contact with the p-body layer exists in a region covering at most 95% of a source-drain distance that is a distance from an end of the field oxide film contacting the high concentration N-type layer in contact with the drain electrode to ends of the gate electrode and the gate oxide film both in contact with the high concentration N-type layer contacting the source electrode.

3. A semiconductor device for an automobile engine control unit, wherein:

a rated breakdown voltage of the semiconductor device is higher than 40 volts;

the semiconductor device is provided with an NPN bipolar transistor on an N-type SOI substrate, the NPN bipolar transistor including a collector electrode, an emitter electrode and a base electrode both disposed via a field oxide film, a high concentration N-type layer in contact with the collector electrode, a high concentration N-type layer in contact with the emitter electrode, a high concentration P-type layer in contact with the base electrode, and a P-type base region in contact with the high concentration N-type layer contacting the emitter electrode and the high concentration P-type layer contacting the base electrode; and

between the P-type base region and the collector electrode over an interface of a buried oxide film in the silicon substrate being in contact with both the field oxide film and the high concentration N-type layer contacting the collector electrode of the NPN bipolar transistor, an N-type layer having a concentration higher than a concentration of the N-type layer in contact with the P-type base region exists in a region covering at most 95% of a collector-base distance that is a distance from an end of the field oxide film contacting the high concentration N-type layer in contact with the collector electrode to an end of the field oxide film in contact with the P-type base region.

4. A semiconductor device for an automobile engine control unit, wherein:

a rated breakdown voltage of the semiconductor device is higher than 40 volts;

the semiconductor device is provided with a P-channel insulated-gate field-effect transistor on an N-type SOI substrate, the P-channel insulated-gate field-effect transistor including high concentration N-type and P-type layers both in contact with a source electrode, a gate insulating film/gate electrode in contact with the high concentration P-type layer, a high concentration P-type layer in contact with a drain electrode disposed in a lateral direction via a field oxide film contacting the gate electrode, an N-type semiconductor layer (n-body layer) contacting the gate oxide film and the high concentration N-type and P-type layers both in contact with the source electrode, and a P-type layer contacting the gate oxide film and extending under the field oxide film toward the drain electrode to be contact with the drain electrode; and

an N-type layer wholly in contact with a buried oxide film, immediately under the n-body layer has a concentration from $3 \times 10^{16}/cm^3$ to $1 \times 10^{22}/cm^3$.

5. A semiconductor device for an automobile engine control unit, wherein:

a rated breakdown voltage of the semiconductor device is higher than 40 volts;

the semiconductor device is provided with a PNP bipolar transistor on an N-type SOI substrate, the PNP bipolar transistor including a 2-type layer formed in the device-forming region without contacting a buried oxide film, a collector electrode, an emitter electrode and a base electrode both disposed via a field oxide film, a high concentration P-type layer in contact with the collector electrode, a high concentration P-type layer in contact with the emitter electrode, a high concentration N-type layer in contact with the base electrode, and an N-type base region

contacting the high concentration P-type layer in contact with the base electrode and the high concentration N-type layer in contact with the base electrode; and

an N-type layer wholly in contact with the buried oxide film, immediately under the N-type base region has a concentration from $3 \times 10^{16}/cm^3$ to $1 \times 10^{22}/cm^3$.